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XIII.—*On a new Chelonian from the Kimmeridge Clay of Swindon.* By CHARLES W. ANDREWS, D.Sc., F.R.S.
(British Museum, Natural History).

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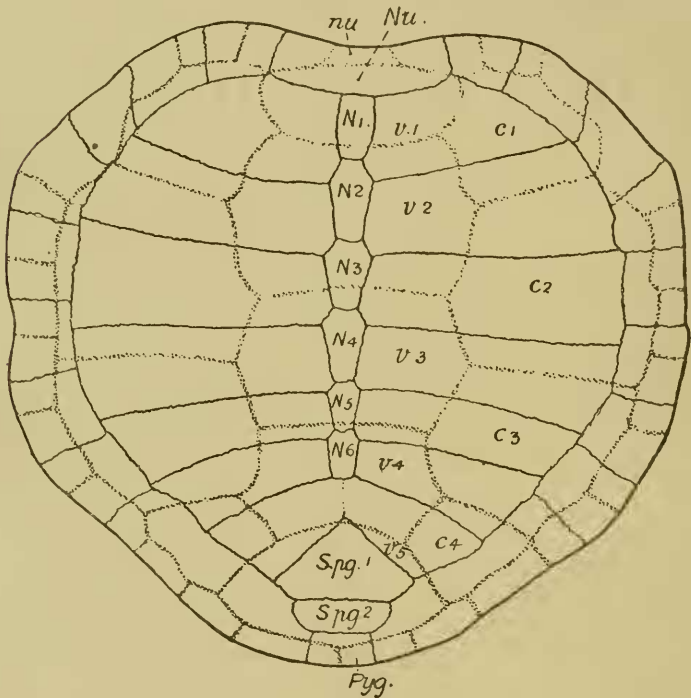
THE Chelonian remains which are the subject of the present notice were collected by Mr. A. D. Passmore in 1905. They were found at a depth of 12-14 feet in blue Kimmeridge Clay near the south-east corner of the Recreation Ground, Swindon, and close to the spot from which the skeleton of *Omosaurus armatus* was obtained some years before; remains of *Ichthyosaurus* and *Steneosaurus* were also found in the immediate neighbourhood. The carapace and plastron, which are both well preserved, were lying in natural association, and from the included and surrounding matrix a number of bones of the skeleton were collected, adding greatly to the value of the specimen, which, in fact, appears to be by far the most complete Chelonian ever obtained from this horizon in England, although very numerous and complete specimens have been described by Rüttimeyer and others from contemporary deposits in France, Germany, and Switzerland.

The *carapace* (fig. 1) is broadly cordate in outline, its length (351 mm.) in the middle line being slightly less than its greatest width (390 mm.), which occurs about the level of the

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seventh marginals. The width has clearly been somewhat exaggerated by the flattening that the shell has undergone, but probably even in an uncrushed state the convexity of the carapace was comparatively slight. The anterior border is concave in the middle; then, external to this, the outline as far as the ninth marginal forms nearly the arc of a circle;

Fig. 1.



Tholemys passmorei, gen. et sp. n. Diagram of dorsal aspect of the carapace of the type-specimen. $\frac{1}{4}$ nat. size.

c_1-c_4 , costal shields; N_1-N_6 , neural bones; $Nu.$, nuchal bone; $nu.$, nuchal shield; $Pyg.$, pygal bone; $S.pg.^1$, $S.pg.^2$, first and second supra-pygals; v_1-v_5 , vertebral shields.

behind this there is a slight concavity and the posterior border of the shell is broadly convex.

The nuchal bone has a concave anterior border; its width (104 mm.) is about three times its length on the middle line. The first neural bone seems to have been comparatively

small and four-sided, the next six were hexagonal in outline, the antero-lateral border being very short; these six neurals (2-7) decrease in length from before backwards. The form and relations of the last neural are obscured by fractures, and it cannot be seen whether it met the upper suprapygal or not. This latter is nearly triangular in outline, with rounded postero-lateral angles; it is about as wide as it is long. The lower suprapygal is much wider than long, and its anterior border is longer than the posterior, which unites with the rectangular pygal.

The anterior costal plate is comparatively large; its posterior border is about 103 mm. long, and externally it meets the first and second marginals. The second and third costals widen somewhat towards their outer end. The fourth costal is the longest (147 mm.), about three and a half times its width. The next four costals shorten successively, and all widen toward their outer ends.

The marginals are large and take a considerable share in the formation of the carapace, especially in the hinder region, where in the case of the eighth and ninth their width (55 mm.) is greater than their length (45 mm.) measured along the edge of the shell; in this region they are about twice as wide as the marginal shields. Marginals 2-8 form the support of the plastral bridge; in 4, 5, and 6 the ventral portion of the bone makes an angle of a little less than a right angle with the dorsal portion, so that the edge of the shell in this region was very blunt; behind this the angle becomes more acute, till behind the bridge the carapace has a sharp edge. The sternal chambers must have been large.

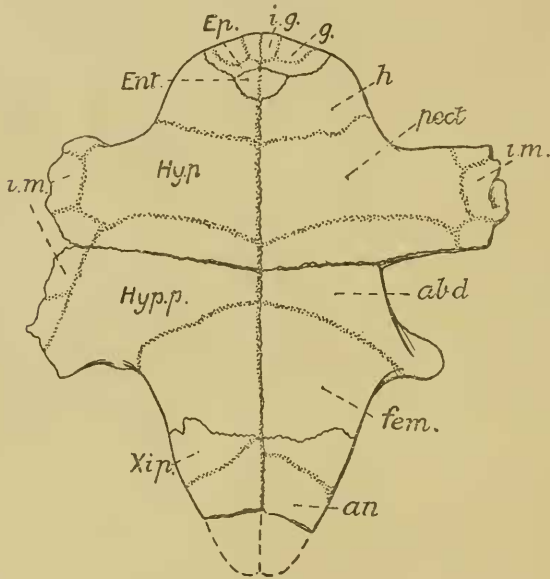
The rib of the first costal is well developed, and at the outer end of the plate there is a strongly developed facet for union with the upward prolongation of the hyoplastral bone forming the anterior buttress. The facet for the posterior (hyposternal) buttress is borne mainly by the fifth costal, but in part also by the sixth costal and eighth marginal. The eighth costal bears a roughened prominence, evidently for union with the upper end of the ilium.

The nuchal epidermal shield was small, being very narrow from before backwards. There were twelve pairs of marginal shields, much narrower than the marginal bones, with which they alternate. The anterior vertebral shield is about 108 mm. wide by 33 mm. long. The next three vertebral shields are rather wider, and their length is about two-thirds of the width. The last is nearly semicircular in outline. The form of the costal shields and their relations to the surrounding elements will be best understood from the figure. All the

grooves marking the limits of the epidermal shields are rather faintly marked; this is especially noticeable on the plastron.

The *plastron* (fig. 2) is nearly completely preserved, wanting only a part of the right epiplastral and the extremities of the xiphiplastrals. The latter loss is unfortunate, because it makes it impossible to be sure whether the posterior end of the plastron was notched as in *Pleurosternum*, but I believe that

Fig. 2.



Tholemys passmorei, gen. et sp. n. Diagram of ventral aspect of plastron.
 $\frac{1}{4}$ nat. size.

abd., abdominal shield; *an.*, anal shield; *Ent.*, entoplastron; *Ep.*, epiplastron; *g.*, gular shield; *h.*, humeral shield; *Hyp.*, hyoplastron; *Hyp.p.*, hypoplastra; *i.g.*, intergular shield; *i.m.*, inframarginal shields; *pect.*, pectoral shield; *Xip.*, xiphiplastron.

it was not. The length of the plastron is approximately 310 mm., the length of the bridge 132 mm., the width of the anterior lobe at its middle point 125 mm. The hypo- and hypoplastral buttresses are strongly developed, especially the latter; their points of attachment to the carapace have been noticed above. There seems to have been no central vacuity in the plastron.

The ento- and epiplastra are relatively small. The former is semicircular in outline posteriorly, while in front it is bounded by two nearly straight borders meeting at a very obtuse angle and abutting against the epiplastra, which meet on the middle line in front of it. The suture between the hyo- and hypoplastra crosses the middle of the bridge; there is no trace of a mesoplastron. The suture between the hypo- and xiphiplastra starts from about the middle of the posterior lobe; it first runs directly outwards, then turns sharply forwards for a short distance, and then backwards again to the margin. The anterior lobe is broadly rounded in front, its sides being nearly parallel; the posterior lobe narrows gradually backwards, and probably terminated in a blunt point as in the *Emys jaccardi* of Pictet.

There were gular and intergular epidermal shields, but whether the latter was single or paired cannot be made out. The form and relations of the shields are shown in fig. 2; it may be noted that the anal shields are entirely confined to the xiphiplastral bone and that externally the pectoral and abdominal shields are bordered by a series of inframarginal shields, at least four in number.

On the upper surface of the xiphiplastron, towards its outer and posterior edge, there is an obscure oval, slightly depressed, and roughened scar, more distinctly shown on the right than on the left side; this no doubt marks the point of contact with the lower end of the pubis, with which, however, no fusion took place.

The plastron, as a whole, is much more massively constructed than one would expect from the carapace; thus, on the middle line the hypoplastron is about 20 mm. in thickness, forming a distinct prominence on the inner surface.

The whole surface of the carapace is covered with irregularly rounded pits of varying size. These do not appear to represent a real sculpture, but to result from the action of local decomposition. Rüttimeyer* has described similar pits in some shells of *Plesiochelys*, and suggested that they were formed by the decomposition of nodules of pyrites. If this is the explanation, it is, however, curious that these pits, while very numerous on the outer surface of the carapace, do not occur on the inner side. On the plastron only a few pits of rather larger size are developed.

A certain number of limb-bones, vertebræ, and fragments of skull were found associated with the shell. The skull-fragments are too imperfect for description. Of the fore limb

* "Die fossilen Schildkröten von Solothurn," Neue Denksch. Schweiz. Gesellsch. Naturwiss. vol. xxv. (1873) p. 84.

and shoulder-girdle there are present the imperfect right and left scapulæ and coracoids, together with a left humerus wanting the middle of the shaft. The right *scapula* (fig. 3, 2) is complete with the exception of the end of the blade. The articular end is borne on a well-defined neck; the rugose surface for union with the coracoid is triangular in outline, while the glenoid surface is rather greater than half a circle, and is not concave, but flat, or even slightly convex; it was probably covered with cartilage in life. The precoracoid process and the blade of the scapula diverge at an angle a little greater than a right angle; they are both flattened. The scapula is very like that of *Parachelys* figured by v. Meyer*.

The *coracoids* (fig. 3, 3) are represented by the proximal portion of the right and the expanded distal part of the left. The articular end is crushed, but it can be seen that with that of the scapula it formed a nearly flat oval glenoid surface. The distal portion of the coracoid is much expanded, as in *Glyptops*, *Chelys*, and the Testudinidæ.

The *humerus* (fig. 3, 1) is represented by the two ends of the bone of the left side; its length cannot be determined. The head is massive and rounded, very similar to that seen in *Testudo*. The ulnar crest, which is somewhat incomplete at its summit, is much smaller than in *Testudo*, rises less beyond the head, and is not deflected downwards. The radial crest is much smaller and is deflected on to the surface of the bone beneath the head. Distally the ectepicondylar groove and foramen lie close to the radial border. The distal articulation is divided by a groove into two convexities (for the radius and ulna), as also happens in *Glyptops* according to Hay ('Fossil Turtles of North America,' p. 51). In some respects this humerus approaches that of *Pleurosternum*, but has undergone considerably less modification in the direction of adaptation for swimming.

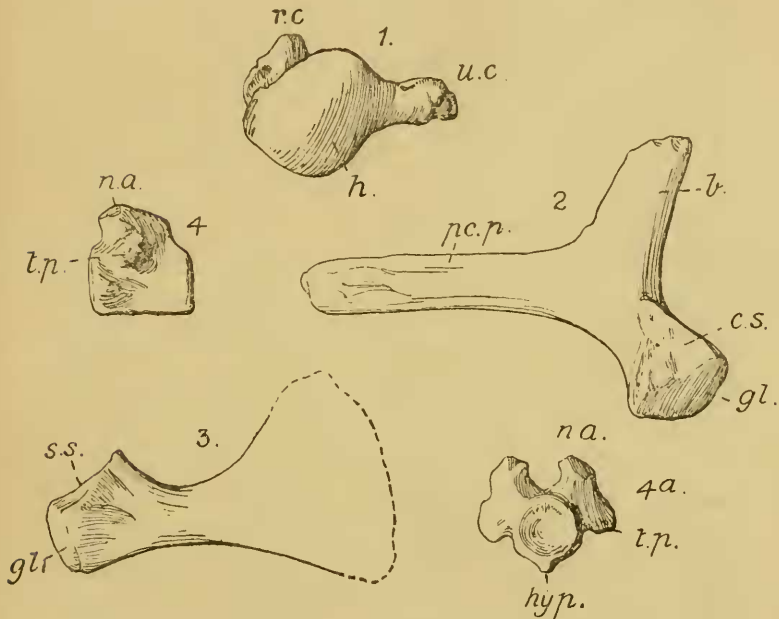
One *ilium* is preserved; the contracted shaft is roughly trihedral in section; both ends are much expanded, the upper, which is somewhat imperfect, bearing a roughened surface for union with the carapace, while the lower, which is still larger, bears the usual facets for the pubis, ischium, and acetabulum.

An imperfect *pubis* was found; it is much crushed and its median process is broken off. At its lower end it terminates in a roughened oval facet, which was no doubt in contact with the corresponding facet on the xiphiplastral.

* 'Palæontographica,' vol. xi. (1864) pl. xlv. figs. 2-4.

Two or three imperfect *cervical vertebrae* (fig. 3, 4, 4 a) are preserved. The ends of their centra are circular in outline and are deeply concave, as in some of the Amphichelydians (*e. g.*, Pleurosternidæ). The ventral portions of the sides of the centra are pinched in, so as to form a strong hypapophysial

Fig. 3.



Tholenys passmorei, gen. et sp. n. 1, upper end of left humerus; 2, right scapula; 3, right coracoid (outline completed from left); 4, cervical vertebra from side, and (4 a) from back. Nat. size.

b., blade of scapula; c.s., coracoidal facet of scapula; gl., glenoid surface of coracoid and scapula; h., head of humerus; hyp., hypapophysis; n.a., base of neural arch; pc.p., precoracoid process of scapula; r.c., radial condyle; s.s., scapular facet of coracoid; t.p., transverse process; u.c., ulnar condyle.

ridge, rather more prominent towards the posterior than towards the anterior end. There are short, stout, transverse processes towards the posterior end, arising just beneath the base of the neural arch, which seems to have been rather massive at its base; the upper part of the arch with the

zygapophysis is broken away. These vertebræ seem to agree very well with those of *Glyptops* described by Hay ('Fossil Turtles of North America,' p. 49).

The dimensions of the more complete of the two cervical vertebræ are:—Length of centrum 13·5 mm., width of posterior articular surface 8 mm., width between ends of transverse processes 17 mm.

There seems to be no doubt that the turtle above described should be referred to the group Amphichelydia, as defined by Lydekker and Baur; the absence of fusion of the pelvic bones with the xiphiplastra, the concavity of the anterior border of the nuchal bone, and the presence of amphicœlous cervical vertebræ separate it from the Pleurodira. The absence of mesoplastra is unusual in the Amphichelydia, but occurs in the Plesiochelyidæ, a family which Hay and others refer to that group.

In its general form this specimen is very similar to the turtle described and figured by Rüttimeyer* as *Plesiochelys jaccardi*, but in details of structure there are considerable differences—*e. g.*, in the form of the vertebral shields,—which in the present specimen diminish in size from the second to the fourth, while in Rüttimeyer's specimen the second and fourth are larger than the third. The form of the anterior lobe of the plastron is also very different.

The specimen described and figured by Rüttimeyer as *Plesiochelys jaccardi* differs in several respects from the original *Emys jaccardi* of Pictet †, and is probably really a different species. Pictet's species differs considerably from our specimen in (1) the much greater width of the vertebral shields, (2) in the form of the anterior lobe of the plastron and particularly of the entoplastral bone. I regard our specimen as specifically distinct from both Rüttimeyer's and Pictet's specimens. As to its generic reference, there is considerable difficulty. Rüttimeyer, in his definition of the genus *Plesiochelys*, states that the pelvis is united with the plastron, and although, so far as I can find, he gives no figure or description of such a union in the case of the type-species *P. solodurensis*, he does figure the posterior part of a plastron of *P. etalloni* in which such a union took place (*op. cit.* pl. viii. fig. 8). Since in our specimen the contact of the pubis with the xiphiplastron is only indicated by an obscure facet, it seems

* "Die fossilen Schildkröten von Solothurn," Neue Denksch. Schweiz. naturg. Gesellsch. Bd. xxv. (1873) pls. ii. and iii.

† "Reptiles et Poissons du Jura Neuchatelois," Matériaux pour la Paléontologie Suisse, sér. iii. 1, p. 15, pls. i.-iii.

impossible to refer it to the genus *Plesiochelys*, although in its general structure it seems closely allied. It will probably be best to refer it to a new genus—*Tholemys*,—its specific name being *Tholemys passmorei*, in honour of Mr. A. D. Passmore, the discoverer of this valuable specimen. Possibly *Tholemys* may represent a primitive condition through which the Plesiochelyidæ passed before fusion between the pelvis and xiphoplastra became established.

XIV.—On a new Species of the Oligochaete Genus *Thamnodrilus* (Beddard), with Notes on *Th. gulielmi*. By FRANK E. BEDDARD, M.A., D.Sc., F.R.S.

THIS genus was originally described by myself*, subsequently referred to one or other of Perrier's genera *Anteus* and *Rhinodrilus*, and lastly restored (by Michaelsen) to its original position †. The species now number some forty-five or so, and all of them are dealt with by Michaelsen in the memoir referred to below, and (up to the year 1906) by Cognetti in his comprehensive work upon the Oligochæta of the Neotropical region ‡. The species upon which I here report appears to me to be new, though most nearly related to *Th. columbianus* of Michaelsen and to *Th. darienanus*. To the describer of the latter, Luigi Cognetti de Martiis, I dedicate the present form, and name it *Thamnodrilus cognetti*. The material for the following account I owe to the kindness of Mr. R. H. Burne, Physiological Curator of the Royal College of Surgeons, who was so good as to hand over to me a number of examples of this South-American worm, none of which were at the same time fully mature and complete in length. The largest and most complete individual was some 8 inches long and 12 mm. in breadth at the broadest part of the body (head end). A fragment of another individual indicated a still larger specimen, as the clitellum was 14 or 15 mm. in diameter.

The *prostomium* is broad. The first two segments are

* "On the Structure of a new Genus of Lumbricidæ (*Thamnodrilus gulielmi*)," Proc. Zool. Soc. 1887, p. 154.

† "Die Lumbriciden," Zool. Jahrb., Abth. f. Syst. xli. 1917, p. 1. I am greatly indebted to Prof. J. Stephenson for allowing me the use of a copy of this publication.

‡ "Gli Oligocheti della regione neotropicale," Mem. R. Acc. Sci. Torino, pt. ii. 1906, p. 147.